

ABSTRACT

Upon reception of four GPS signals from GPS satellites and determining four pseudo ranges, along with ephemeris data previously stored in the GPS receiver, the location of the GPS receiver and real time clock time error is determined. The GPS receiver is in possession of four pseudo ranges and determines four unknown coordinate values (x, y, x, and time) identifying the location of the GPS receiver and real time clock error. The process of solving for four pseudo range formulas simultaneously with each pseudo range formula having an unknown "x", "y" "z", and time coordinates of the GPS receiver, results in identification of the coordinates and time of the GPS receiver. In a similar process, the GPS receiver receiving four GPS signals from four GPS satellites is able to determine four pseudo ranges. Using the four pseudo ranges, four pseudo range equations unknown values for "x", "y", "z" and time can be solved for simultaneously. The resulting values are then used to verify that the calculated positions of the GPS satellites are within 0.5 ms of the previous solution. If the GPS satellites are within 0.5 ms range of the prior solution then the real time clock error is estimated. Thus, using ephemeris data, the location of the GPS receiver is determined in a fraction of the time it takes to acquire the GPS satellites using conventional approaches.